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10/586,626

07/19/2006

Kaoru Hoshino

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09/10/2009

OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

ROE, JESSEE RANDALL

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

09/10/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

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|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/586,626 | Applicant(s) HOSHINO ET AL. | |
| | Examiner Jessee Roe | Art Unit 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-16,18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-16,18 and 19 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 June 2008 has been entered.

Status of the Claims

Claims 1, 3-16 and 18-19 are pending wherein claim 1 is amended, claims 18-19 are new, and claims 2 and 17 are canceled.

Status of Previous Rejections

The previous rejection of claims 1 and 3-16 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention is withdrawn in view of the Applicant's amendment to claim 1. The previous rejection of claims 1, 4-7, 12 and 15 under 35 U.S.C. 103(a) as being unpatentable over Kubota (US 5,702,540) is withdrawn in view of the Applicant's amendment to claim 1. The previous rejection of claims 3, 8 and 13-14 under 35 U.S.C. 103(a) as being unpatentable over Kubota (US 5,702,540), and further in view of Hall et al. (US 2,404,060) is withdrawn in view of the Applicant's amendment to claim 1. The previous rejection of claims 10-11 under 35 U.S.C. 103(a)

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as being unpatentable over Kubota (US 5,702,540), and further in view of Hemmer et al. (US 3,281,517) is withdrawn in view of the Applicant's amendment to claim 1.

Claim Objections

Claim 18 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

With respect to the recitation "wherein an internal pressure of said heating furnace is maintained at about atmospheric pressure + 0.5 kPa" in claim 18, because claim 1 recites "wherein an internal pressure of said heating furnace is maintained at atmospheric pressure or greater" and "about atmospheric pressure + 0.5 kPa" in claim 18 would not preclude pressures less than atmospheric pressure, claim 18 fails to further limit claim 1.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3-16 and 18-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in

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such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In regards to claim 1, the specification does not provide support for the recitation "wherein an internal pressure of said heating furnace is maintained at atmospheric pressure or greater" in lines 6-7 of claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4-7, 12, 15-16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ewalt et al. (US 4,175,986).

In regards to claims 1 and 5-6, Ewalt et al. ('986) discloses heating ferrous articles in a furnace with a gas mixture comprising hydrocarbons such as acetylene and ethylene in an amount of 5 to 30% by volume and up to 10% by volume ammonia (Figure 1, col. 5, lines 32-44, col. 6, lines 35-41 and col. 6, line 64 – col. 7, line 4). Ewalt et al. ('986) further discloses that the temperatures utilized for the heat treating process would be in the range of about 1650°F (899°C) to about 1725°F (941°C) and that the furnace pressure would be slightly above atmospheric pressure to minimize air leakage (col. 7, lines 10-20).

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With respect to the recitations “to form HCN under catalytic action” and “causing the thus-formed HCN to act on said surface of said metal member”, although Ewalt et al. ('986) is silent with respect to the formation of HCN, the Examiner asserts that the formation of this compound would be expected and would act on the surface of the ferrous (metal) member since Ewalt et al. ('986) teaches the same reactants and the same temperature and pressure conditions as the instant invention. MPEP 2112.01 I.

With respect to the recitation “for activating a surface of a metal member” in line 1 of claim 1, because Ewalt et al. ('986) discloses the same steps as the instant invention, it would be expected that the surface of the ferrous member disclosed by Ewalt et al. ('986) would also be activated.

With respect to the recitation “wherein HCN is formed to at least 100 mg/m³ in said heating furnace and a furnace atmosphere gas has a dew point not higher than 5°C” in claim 4, the Examiner asserts that this would be expected in Ewalt et al. ('986) because Ewalt et al. ('986) discloses the same reactants and the same temperature and pressure conditions as the instant invention. MPEP 2112.01 I.

With respect to the recitations “wherein said HCN is formed under catalytic action of said metal member” in claim 7 and “wherein said HCN is formed in said heating furnace in a concentration of from 100 to 30,000 mg/m³” of claim 12, the Examiner notes that Ewalt et al. ('986) discloses applying the same gases to a metal member. Therefore, HCN formed under catalytic action of the steel member and HCN formed at a concentration of from 100 to 30,000 mg/m³”

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would be expected. MPEP 2112.01 I.

With respect to the recitation "wherein after causing the thus-formed HCN to act on said surface of said metal member said method further comprises nitriding or carburizing the metal member" in claim 15, the Examiner asserts that this would be expected in Ewalt et al. ('986) because Ewalt et al. ('986) discloses the same reactants and the same temperature and pressure conditions as the instant invention. MPEP 2112.01 I.

With respect to the recitation "wherein a percentage of ammonia in the mixed gas is about 50% by volume" in claim 16, Ewalt et al. ('986) discloses up to 10% by volume ammonia (col. 6, lines 35-41) where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. MPEP 2144.05 II.

In regards to claims 18-19, Ewalt et al. ('986) discloses that the pressure would be slightly above atmospheric pressure to minimize air leakage (col. 7, lines 10-20). This pressure would be substantially the same as the instant invention. Therefore, an internal pressure of said heating furnace sufficient to force effluent gas out of the furnace would be expected.

With respect to the recitation "wherein a ratio of a flow rate of ammonia to a flow rate of carbon donor compound into said heating furnace is 1:0.0001 to 1:0.1" in lines 9-10 of claim 1, it is not inventive to discover by the optimum or workable ranges by routine experimentation. MPEP 2144.05 II.

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Claims 3, 8, 10-11 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ewalt et al. (US 4,175,986) as applied to claims 1 and 7 above, and further in view of Holt (US 1,984,411).

In regards to claims 3 and 13, Ewalt et al. ('986) discloses heating ferrous articles in a furnace with a gas mixture comprising hydrocarbons such as acetylene and ethylene with up to 10 volume percent ammonia. However, Ewalt et al. ('986) does not specify that the inner wall of the furnace comprises at least one metal selected from the iron, nickel, cobalt, copper, chromium, molybdenum, niobium, vanadium, titanium and zirconium.

In the same field of endeavor, Holt ('411) teaches that if the chamber in which iron and steel materials are case hardened is constructed of or lined with nickel, superior results are obtained due to the catalytic effect of nickel (pg. 1, lines 41-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the furnace, as disclosed Ewalt et al. ('986) by constructing the chamber out of nickel or silica, as disclosed by Holt ('411), in order to obtain superior results due to the catalytic effect of nickel (pg. 1, lines 41-60).

With respect to the recitation "wherein said HCN is formed under catalytic action of said metal-made inner wall of said furnace" of claim 8 and "wherein said inner wall of said furnace is made of metal and wherein said HCN is also formed under catalytic action of said wall of said furnace" of claim 14, the Examiner asserts that this would be expected in Ewalt et al. ('986) in view of Holt ('411)

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because Ewalt et al. ('986) in view of Holt ('411) discloses the same metal, the same gases and the same temperature and pressure conditions. MPEP 2112.01 I.

In regards to claims 10-11, Holt ('411) discloses that the walls of the furnace may be made of silica (pg. 1, lines 41-60).

Claims 3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ewalt et al. (US 4,175,986) as applied to claim 1 above, and further in view of Lightle (US 2,095,565).

In regards to claims 3 and 9, Ewalt et al. ('986) discloses heating ferrous articles in a furnace with a gas mixture comprising hydrocarbons such as acetylene and ethylene with up to 10 volume percent ammonia. However, Ewalt et al. ('986) does not specify that using a metal-made jig.

Lightle ('565) discloses placing metal articles to be carburized in a box (jig) made out of chromium-nickel alloys in order to uniformly subject the articles to carburization (pg. 1, col. 1, lines 1-17, pg. 1, col. 1, lines 32-48 and pg. 2, col. 1, lines 30-33).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of heating ferrous articles in a furnace with a gas mixture comprising hydrocarbons such as acetylene and ethylene with up to 10 volume percent ammonia, as disclosed by Ewalt et al. ('986), by placing the article in a chromium-nickel box, as disclosed by Lightle ('565), in order to uniformly subject the articles to carburization, as

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disclosed by Lightle ('565) (pg. 1, col. 1, lines 1-17, pg. 1, col. 1, lines 32-48 and pg. 2, col. 1, lines 30-33).

Response to Arguments

Applicant's arguments with respect to claims 1, 3-16 and 18-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art
Unit 1793

/JR/